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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,791	12/31/2001	Toshiyuki Kaeriyama	TI-29135	2971

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EXAMINER

JOLLEY, KIRSTEN

ART UNIT PAPER NUMBER

1762

DATE MAILED: 03/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/038,791

Applicant(s)

KAERIYAMA ET AL. 

Examiner

Kirsten C Jolley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 2, 4-11, 16, 17 and 19-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 12-15 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/24/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. It is noted that U.S. Application Nos. 09/886,781, 10/036,698, and 10/038,813 have been considered, however the application numbers have been crossed through on the IDS PTO-1449 form filed May 24, 2002 because it is not U.S. practice to print application numbers on the front of a U.S. patent. Instead, the Examiner has included the corresponding applications' pre-grant publication numbers on the attached PTO-892 form.

Election/Restrictions

2. Claims 2, 4-11, 16-17, and 19-45 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in paper filed January 21, 2004. It is noted that upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141.

3. Claims 1, 3, 12-15, and 18 are examined herein.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent

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and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1, 3, 12-15, and 18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-23 of copending Application No. 10/038,813. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious for one having ordinary skill in the art to have removed the overcoat from the separated micromechanical devices since the overcoat is not desired on a final micromechanical device product or else the coating would prevent movement of the device.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

6. Claims 1, 3, 12-15, and 18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-42 of copending Application No. 09/886,781. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one having ordinary skill in the art to have removed the overcoat material from the micromechanical device because an overcoat is not desired on a final

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micromechanical device product or else the coating would prevent movement of the device. It would have also been obvious for one having ordinary skill in the art to have further formed at least two micromechanical devices on a common substrate and then separated the devices from the common substrate because it is well known in the micromechanical device manufacturing art to prepare a plurality of devices simultaneously on a common substrate.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3, and 12-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Miller et al. (US 2002/0012744).

Miller et al. discloses: forming at least two micromechanical devices on a common substrate (paragraph [0020]); applying a liquid overcoat material to said micromechanical devices by spin coating (paragraph [0041]); and separating said common substrate to separate said micromechanical devices by dicing and then removing

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said overcoat material (paragraph [0019]). Miller et al. teaches curing by heating in paragraph [0041]).

9. Claims 1, 14, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Peterson et al. (US 6,335,224).

Peterson et al. discloses: forming at least two micromechanical devices on a common substrate; applying an overcoat material to said micromechanical devices; and separating said common substrate to separate said micromechanical devices by dicing and then removing said overcoat material (col. 4, lines 31-37, and col. 8, lines 53-60). Peterson et al. states: "Other polymer coating could be used, for example: epoxies, acrylics, urethanes, and silicones. However, those other coatings are generally applied in the liquid state, whereas parylene is applied in the vapor-phase. Liquid coatings generally do not conform as well to the complex 3-D shaped, multi-layer MEMS elements as vacuum vapor-deposited conformal coatings, such as parylene." (col. 5, lines 23-33) Therefore, while it is acknowledged that Peterson et al. teaches that the preferred embodiment includes applying parylene overcoat material via vapor deposition, Peterson et al. none-the-less teaches that liquid coatings may be applied as protective coating 14 with the knowledge that the liquid coatings do not conform as well and provide as good results as vapor deposited parylene.

As to claim 18, Peterson et al. teaches that the protective coating 14 may be removed by isotropic etching (col. 7). As to claim 14, curing would necessarily occur when using liquid coatings; Peterson et al. discusses curing of the protective layer in col. 6.

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10. Claims 1, 3, 12, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kao et al. (US 5,923,995).

Kao et al. discloses a method comprising the steps of: forming at least two micromechanical devices 310 on a common substrate 300 (col. 4, lines 23-38 and Figure 2A); applying a liquid water-soluble overcoat material to the micromechanical devices to form first protective layer 320 (col. 4, lines 39-45 and Figure 2B); separating said common substrate to separate said devices by sawing (col. 5, lines 19-22 and Figure 2D); and removing the overcoat from said micromechanical devices (col. 5, line 64 to col. 6, line 37 and Figure 2E).

As to claim 3, Kao et al. teaches that first protective layer may be applied by spin coating (col. 4, lines 39-43). As to claim 12, the protective layer is inherently cured in order to allow the saw to "cut" it (liquid layers cannot be cut). As to claim 18, the removal step of washing with water meets the limitation of an isotropic etch.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were

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made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 2002/0012744).

Miller et al. does not teach that curing of the liquid overcoat material in its invention can be cured using ultraviolet light. Miller et al. states in paragraph [0041] that "Various curing methods can be used to evaporate the solvent from the coating material." The Examiner notes that ultraviolet light is a well known means for curing coatings in the coating art. It would have been obvious for one having ordinary skill in the art to have used ultraviolet light as the means for curing the overcoat material in Miller et al.'s process with the expectation of successful results since Miller et al. is specifically not limiting as to the means of curing used and since ultraviolet light is a well known means for curing coatings.

14. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson et al. (US 6,335,224).

As to claims 13-14, Peterson et al. lacks a teaching of the methods used to cure protective coating 14 if the protective coating is applied as a liquid coating, as discussed above and in col. 5, lines 25-33. The Examiner notes that heating and ultraviolet light are two well known means for curing coatings in the coating art, particularly for epoxy,

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acrylic, urethane, and silicone coating materials. It would have been obvious for one having ordinary skill in the art to have performed the curing of a liquid protective coating material in Peterson et al.'s process by heating or ultraviolet light with the expectation of successful results since such is well known in the art.

As to claim 15, Peterson et al. discloses use of acrylics and urethanes as two of the potential coating materials. It is the Examiner's position that it would have been obvious to have selected any known acrylic or urethane, including urethane acrylate, as the protective coating material in Peterson et al.'s method with the expectation of successful results since Peterson et al. is not limited to specific coating compositions.

15. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson et al. (US 6,335,224) as applied to claim 1 above, and further in view of Miller et al. (US 2002/0012744) or Wallace et al. (US 5,512,374) or Kao et al. (US 5,923,995).

Peterson et al. is applied for its general teaching of applying a liquid protective resin to a substrate having free-standing MEMS devices thereon, however Peterson et al. lacks a teaching of how to apply the liquid material to the substrate. One having ordinary skill in the art would have been motivated to look to the prior art to determine conventional methods for applying a liquid coating material to a substrate having MEMS devices thereon. Miller et al. and Wallace et al. and Kao et al. are all cited for their teachings of applying liquid coatings to a substrate with MEMS devices using spin coating (see paragraph [0041] of Miller et al., and col. 5, lines 53-54 of Wallace et al., and col. 4, lines 39-43 of Kao et al.). It would have been obvious for one skilled in the art to have applied the liquid coating in the process of Peterson et al. by spin coating upon

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seeing the references of Miller et al., Wallace et al., and Kao et al. because Peterson et al. is silent with regard to a means for coating, and because Miller et al., Wallace et al., and Kao et al. teach successful results using spin coating to apply liquid coatings materials to substrates with free-standing MEMS devices thereon.

16. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. (US 5,923,995).

As to claims 13-14, Kao et al. lacks a teaching of the methods used to cure first protective coating layer 320. The Examiner notes that heating and ultraviolet light are two well known and commonly used means for curing water-soluble coatings in the coating art. It would have been obvious for one having ordinary skill in the art to have performed the curing of first protective coating material in Kao et al.'s process by heating or ultraviolet light with the expectation of successful results since such is well known in the art.

17. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. (US 5,923,995) as applied to claim 1 above, and further in view of Johnson (US 6,207,346).

Kao et al. is applied for the reasons discussed above with respect to claim 1. Kao et al. lacks a teaching of the coating material used to form the water-soluble first protective coating layer 320. One skilled in the art would have been motivated to look to the prior art for water-soluble coating compositions that may be used as first protective layer 320. The Examiner notes that photoresist coatings are well known in the art for

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providing protective coatings to substrates having MEMS devices thereon. (See the "references cited" section below for exemplary references teaching use of photoresist resins as protective coatings on wafers having MEMS devices thereon.) Johnson et al. is cited as being directed to a waterborne (and thus water-soluble) photoresist composition that may be used as a protective coatings (col. 1, line 12). The composition of Johnson et al. comprises urethane acrylate resin. It would have been obvious for one having ordinary skill in the art to have used the protective photoresist composition of Johnson et al. as protective coating layer 320 in the method of Kao et al. with the expectation of successful results since Kao et al. is not limiting as to the composition that may be used as long as it is water-soluble and since photoresists are known protective coatings for sawing/dicing of substrates having MEMS devices thereon.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kaeriyama et al. (US 5,872,046) and Brenner et al. (US 6,063,696) are both cited to demonstrate the use of photoresist coatings as protective coatings during sawing/dicing of substrates having MEMS devices, such as DMDs, thereon (see col. 5 of both Kaeriyama et al. and Brenner et al.).

Wojnarowski (US 5,888,884) is cited for its teaching of applying insulating coating on a substrate having MEMS devices thereon.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C Jolley whose telephone number is 571-272-

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1421. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on 571-272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kirsten C Jolley
Patent Examiner
Art Unit 1762

kcj